Biological Assessment
for
Threatened and Endangered Species

Whitetop Spruce Restoration
George Washington and Jefferson National Forests
Mount Rogers National Recreation Area
Smyth, Grayson, and Washington Counties, Virginia

1. Introduction

Forest Service Manual (FSM) Section 2672.41 requires a biological assessment (BA) for all Forest Service planned, funded, executed, or permitted programs and activities. The objectives of this BA are to: 1) ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native species or contribute to trends toward federal listing, 2) comply with the requirements of the Endangered Species Act (ESA) so that federal agencies do not jeopardize or adversely modify critical habitat (as defined in ESA) of federally listed species, and 3) provide a process and standard to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision-making process using the best available science.

The Mount Rogers National Recreation Area supports known occurrences and suitable habitat for several TES species, all of which were considered in this analysis. This BA documents the analysis of potential effects of the proposed project to TES species and associated habitat. It also serves as biological input into the environmental analysis for project-level decision making to ensure compliance with the ESA, National Environmental Policy Act (NEPA), and National Forest Management Act (NFMA).

Affected Area

The proposed project is located in Smyth, Grayson, and Washington Counties, VA. It reaches from the peak of Whitetop Mountain at 5,560 ft down to approximately 4,000 ft in elevation except for the Upper Helton drainage where the project boundary extends below 4,000 ft due to known spruce locations being below that elevation. Please see maps 1 and 2 for a more detail on the project boundary. Primary natural community types within the project area include Southern Appalachian Spruce forest, Southern Appalachian Northern hardwood forest, high elevation acidic cover forest, and Southern Appalachian grassy bald. This area comprises one of the most diverse assemblages of flora and fauna in the state of Virginia (USDA, 2004). Open area prescribed fire, road maintenance, trail maintenance, and activities associated with grazing are currently the only management actions taking place within the proposed project area.

Figure 1. Whitetop Spruce Restoration Boundary Topographic Map.

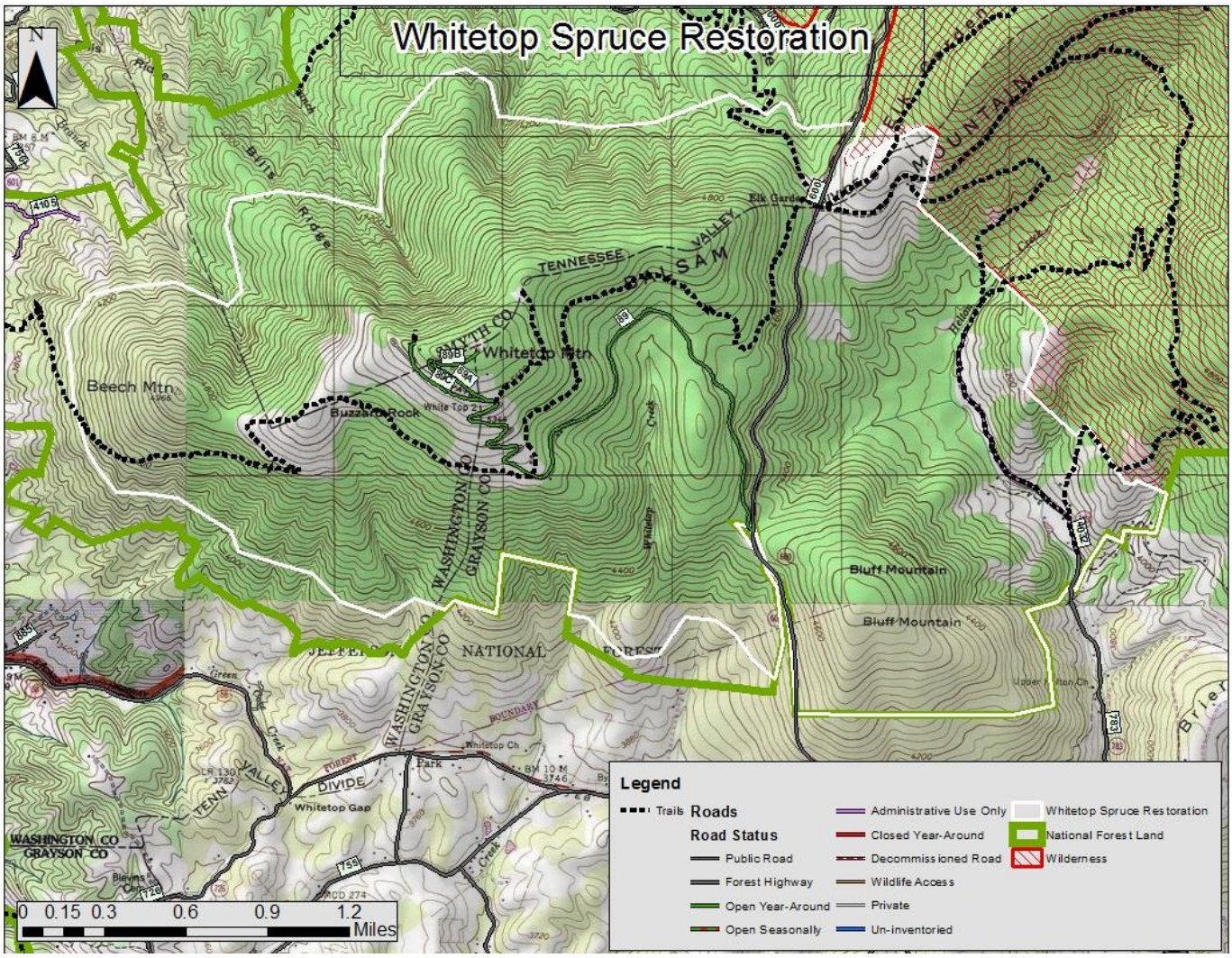
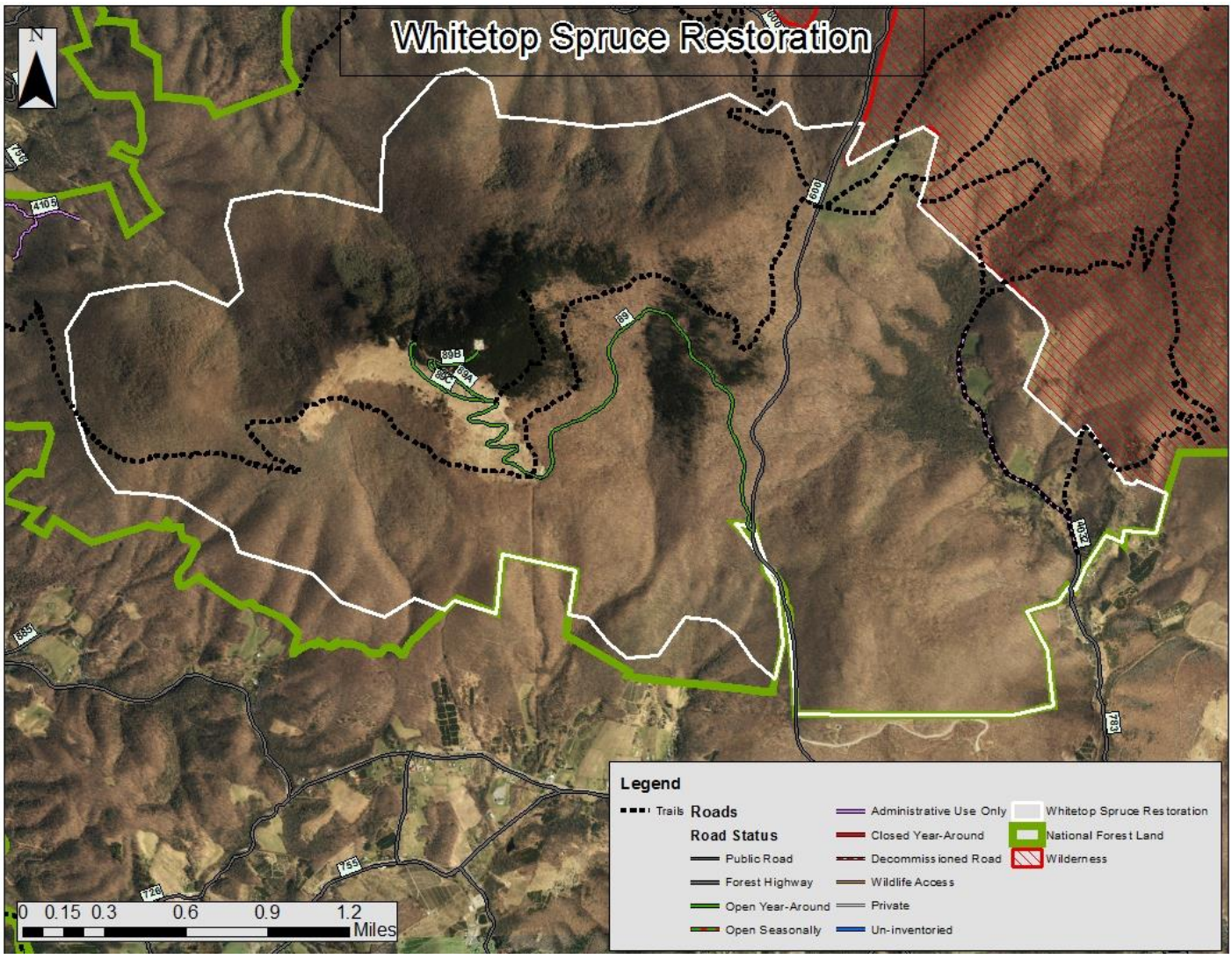


Figure 2. Whitetop Spruce Restoration Boundary Aerial Imagery.



Purpose and Need

The purpose of the project is to increase habitat connectivity between the isolated spruce forest pockets on Whitetop by selectively girdling and felling northern hardwood trees in direct competition for sunlight with midstory and understory spruce. In locations where no advanced regeneration is present, the reintroduction of spruce for habitat connectivity will require planting transplanted and nursery seedlings. Releasing these spruce trees would encourage spruce into the overstory and improve cone production. This will ensure an increase in advanced regeneration of spruce and increase the size of spruce patches where they exist. The Revised Land and Resource Management Plan (Forest Plan) for the Jefferson National Forest outlines the management goals for the Mount Rogers National Recreation Area. This project is in line with the objectives of the forest plan. Whitetop Mountain is identified in the forest plan as a special area with an objective of restoring 900 acres of the montane spruce-fir forest community (USDA, 2004). Spruce and spruce-northern hardwood habitats are vital for the survival of many rare and

federally listed species endemic to these habitats include the Carolina Northern Flying Squirrel, spruce-fir moss spider, Northern saw-whet owl, Weller's salamander, Northern pygmy salamander, and rock gnome lichen.

Proposed Action

The forest service is proposing to restore spruce within the Whitetop project area by implementing the following actions:

- Release red spruce in the mid-story and understory by girdling and felling northern hardwood trees that fall within the vertical cylinder (10-15ft) projected above targeted release trees. More information about methodology can be found published in the Natural Areas Journal titled Release of Suppressed Red Spruce Using Canopy Gap Creation – Ecological Restoration in the Central Appalachians which can be found at the link below. https://www.fs.fed.us/nrs/pubs/jrnl/2016/nrs_2016_rentch_001.pdf

- Improve spruce stand resiliency by stratifying existing single aged spruce stands with canopy gaps. Gap creation would involve girdling 2-5 mature spruce trees per acre targeting unhealthy spruce when present.

- Planting red spruce seedlings in suitable sites currently absent of spruce. Seedlings will be acquired through either nursery stock grown from Whitetop spruce cones or by transplanting seedlings from within the project area. Once established, seedlings would be released through girdling and brush cutting as needed.

These activities would take place gradually as funds and labor become available. It is expected that it would take over 10 years to treat all the currently suitable restoration sites within the project area boundary, and new treatment areas would emerge down the road as initial treatments start to show success. The project area boundary shown in figures 1 and 2 was designed to incorporate all potential spruce restoration sites outside wilderness areas, those that are known and unknown. All acres within the boundary are not planned for treatment, only those that are deemed suitable for spruce restoration.

Minimization Measures

Due to the sensitivity and rarity of the flora/fauna located in the project area, coordination measures are needed to protect federally listed and forest sensitive species. Also, coordination measures are needed to reduce impacts to other resource areas. Coordination measures include:

- Chainsaw activities will not take place March 15thst – August 31st to avoid impacts to Carolina Northern Flying Squirrel during the breeding season.

- Girdling, planting, and seedling planting/transfer sites will be surveyed for rare plants during the growing season prior to implementation. If federally listed plants are found at these locations, individuals will be buffered from impacts to ensure protection. Mitigation measures for sensitive plant species will be evaluated on a case by case basis to ensure that project activities do not cause a trend towards federal listing.

- Archeology will be consulted on planting/transplanting sites prior to implementation to ensure no archeological sites are disturbed during implementation
- No girdling will take place within 100 feet of rock gnome lichen locations
- Hardwoods ≤ 8 inches DBH may be felled if needed
- Yellow birch trees greater than 8 inches in diameter are to be favored as leave trees because they are important potential den trees and provide nesting material for Carolina Northern Flying Squirrels
- Trees with cavities and dreys are to be designated as leave trees for Carolina Northern Flying Squirrel den sites.
- Trees within 50 feet of the trails or roads are not to be girdled to avoid potential impacts to forest users, trees ≤ 8 inches may be felled within this buffer zone
- Shaded, moist rock outcrops with bryophytes that currently provide suitable habitat for spruce-fir moss spider would receive a 100 foot buffer to protect habitat for this species.

Consultation History

A meeting between USFS, ATC, and USFWS was conducted on 03/23/2020 to cooperatively develop the proposed action and coordination measures needed to protect federally proposed, threatened, and endangered species.

2. Species considered

Analysis of the proposed action was conducted using the best available science, including references from science-based websites, books, papers, reports, state and federal databases, field surveys, and professional opinions. Information from field visits, project area habitat conditions, species habitat requirements, species distributions, Fish and Wildlife Information Service of the Virginia Department of Game and Inland Fisheries (VDGIF) and Virginia division of natural heritage (VDHF) element occurrence databases, the George Washington and Jefferson OAR list with step down process (Appendix A) and a species list USFWS IPAC system were used to determine what species were likely to occur in the project area. The forest's GIS database was also examined to locate any records of threatened or endangered species in the project area or vicinity.

An official species list was requested from the USFWS IPAC system and was received on June 23, 2020. The IPAC system identified 14 species that are known to occur within the counties where the project is located or in adjacent counties. However, some of the species identified are either not located in the same watershed, are very far downstream of the project area, do not have suitable habitat in the project area, or have no known occurrences in the project area. See Table 1 for species considered and included/excluded from further analysis in this biologist assessment. For species excluded from further analysis, it was determined that the proposed project would have **no effect** on them because they either are unlikely to

occur within the project area, are far enough downstream to not be affected by project implementation, or do not have suitable habitat present in the project area.

Table 1. Threatened and endangered species identified by the USFWS IPAC system and rationale for consideration in this analysis.

Common Name	Scientific Name	Status	Species Type	Considered but Excluded from further Analysis	Considered Further in the BA
Carolina Northern Flying Squirrel	*Glaucomys sabrinus coloratus*	Endangered	Mammal		✓
Gray Bat	*Myotis grisescens*	Endangered	Mammal	✓[2]	
Indiana Bat	*Myotis sodalis*	Endangered	Mammal		✓
Northern Long-eared Bat	*Myotis septentrionalis*	Threatened	Mammal		✓
Virginia Big-eared Bat	*Corynorhinus townsendii virginianus*	Endangered	Mammal	✓[1]	
Spotfin Chub	*Erimox monachus*	Threatened	Fish	✓[1]	
Fluted Kidneyshell	*Ptychobranchus subtentum*	Endangered	Clam	✓[1]	
Littlewing Pearlymussel	*Pegias fabula*	Endangered	Clam	✓[1]	
Shiny Pigtoe	*Fusconaia cor*	Endangered	Clam	✓[1]	
Slabside Pearlymussel	*Pleuronaia dolabelloides*	Endangered	Clam	✓[1]	
Tan Riffleshell	*Epioblasma Florentina walkeri*	Endangered	Clam	✓[1]	
Spruce-fir Moss Spider	*Microhexura montivaga*	Endangered	Arachnid		✓
Roan Mountain Bluet	*Hedyotis purpurea var. montana*	Endangered	Flowering Plant		✓
Rock Gnome Lichen	*Gymnoderma lineare*	Endangered	Lichen		✓

Notes:
[1] Project areas are not within the species' known range or watershed on the Mount Rogers National Recreation Area.
[2] Project areas are not currently appropriate or potentially appropriate habitat for the species.

3. Effects of the proposed action on threatened and endangered species

Carolina Northern Flying Squirrel

Introduction

This primarily nocturnal species is restricted to the high elevations of southern Appalachians in Tennessee, North Carolina, and Virginia. This species prefers coniferous and mixed forests with 'boreal' characteristics but has been known to utilize deciduous woods and riparian woods. Cool, moist, mature

forest (especially mature Red Spruce) with abundant standing and down snags is preferable habitat for this species. Mature trees with cavities are preferred as den sites, but individuals will make twig nests (dreys) and use nest boxes if needed (NatureServe 2020)

The diet of the Carolina northern flying squirrel consists primarily of insects, lichens, fungi, buds, seeds, and fruits. However, this species can subsist on lichens and fungi for extended periods if needed. Carolina northern flying squirrels spend much of their time foraging on the ground. (NatureServe 2020)

This species is threatened because of its restricted range, susceptibility to climate change, competition with southern flying squirrels at moderate elevations, and habitat degradation (loggings, insect pest damage, and airborne pollution). Please see the recovery plan for this species for more information. **https://ecos.fws.gov/docs/recovery_plan/900924c.pdf**

Direct, Indirect, and Cumulative Effects

There would be minimal if any direct effects to this species. Minimization measures were developed with USFWS in order to ensure the protection of this species. Noisy activities such as running a chainsaw would only take place outside the breeding season so individuals raising young would not be disturbed. This activity would take place throughout the life of the project, but would not take place during the breeding season. Hardwood trees with dreys and cavities would be designated leave trees so potential roost site would not be reduced as a result of project implementation. Yellow birch trees would be favored as leave trees due to their importance for providing nest material and as den trees. Indirect effects are expected to be beneficial. Girdling hardwoods competing with spruce, stratifying even aged spruce stands, and planting spruce seedlings would expand and improve spruce habitat in the long term connecting isolated spruce islands. Girdling trees over 8 inches in diameter would create preserve current unknown den sites and create new potential den sites for this species. This would in turn increase Carolina northern flying squirrel population vigor by creating more habitat for this species and connecting isolated groups to each other.

There would be not cumulative effects as a result of implementing the proposed action. Other activities in the action area such as trail maintenance, grazing, and open area prescribed fire are would not impact montane spruce habitat or spruce/ northern hardwood habitat.

Determination of Effects

This project **may affect** but is **not likely to adversely affect** the Carolina northern flying squirrel because implementing the project would create more habitat for this species in the long term and incorporating minimization measures into the project reduces impacts to this species. Any potential impacts would be temporary and would not lead to the reduction in fitness of individuals.

Indiana Bat

Introduction

The overall range of this species extends from eastern Oklahoma north to Wisconsin and Michigan, east to New England, and south to northern Alabama (Natureserve, 2020). The distribution of Indiana bats is generally associated with limestone caves in the eastern U.S., and within this range, they occupy two distinct types of habitat. During winter, Indiana bats hibernate in caves referred to as hibernacula. Bats are often readily found and easily counted during this hibernation period. Census of hibernating Indiana bats is the most reliable method of tracking population trends range-wide, and winter distribution of the Indiana bat is well documented (USDA FEIS, 2014).

When not in hibernation Indiana Bats forage primarily for winged insects in wooded and semi-wooded habitats utilizing snags, hollow trees, and trees with loose bark as their preferred roost sites (Natureserve, 2020). Adults primarily forage within three miles of the occupied maternity roost. Maternity colonies of more than 100 adult females can be found roosting together under sloughing bark of dead and partially dead trees in forested settings (Callahan et al. 1997). Reproductive females may require multiple alternate roost trees to fulfill summer habitat needs.

Swarming of both males and females and subsequent mating activity occurs at cave entrances prior to hibernation. During this autumn swarming period, bats roost under sloughing bark and in cracks of dead, partially dead, and live trees in proximity to the cave used for hibernation (USDA FEIS, 2014). Indiana bat is one of the species effected by White Nose Syndrome (WNS) and has declined across its range due to fungus infections. Hibernacula and summer roost protection are critical to the survival of this species.

There is currently no critical habitat for this species, known hibernacula or known summer roost sites within the project area.

Direct, Indirect, and Cumulative Effects

There would be no direct effects to this species. Trees over 8 inches would be girdled leaving those trees that are suitable roost trees standing and usable. Noisy activities such as chainsaw girdling would not be conducted in the summer months reducing potential noise disturbance to this species during most of the breeding season. Indirect effects are expected to be beneficial because girdling hardwood trees would turn these trees into snags creating additional potential roost trees for this species.

There would be no cumulative effects as a result of implementing the proposed action. Other activities in the action area such as trail maintenance, grazing, and open area prescribed fire are would not impact montane spruce habitat or spruce/ northern hardwood habitat.

Determination of Effects

Implementing this propose action **may affect** but is **not likely to adversely affect** this species because implementation would create more potential roost trees for this species.

Northern Long-eared Bat

Introduction

This species was listed as threatened on April 2, 2015 due to rapid population declines caused by White Nose Syndrome (WNS). The range of the northern long-eared bat includes much of the eastern and north central United States, and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia. In Virginia, the Northern Long-eared bat (NLEB) was known to occur in every county of the state and prior to WNS was the most commonly captured bat in summer mist-net surveys.

The NLEB is insectivorous and migratory, hibernating in caves and mines during the winter and occupying forests in the summer for feeding and reproduction (USDI, 2016). They typically use large caves or mines with large passages and entrances, constant temperatures, and high humidity with no air currents. Specific areas where they hibernate have very high humidity, so much so that droplets of water are often seen on their fur. During winter hibernation in hibernaculum, NLEB are difficult to locate in bat survey efforts (pers. Com. With Rick Reynolds, VDGIF 2019). In hibernacula they are found in small crevices or cracks, often with only the nose and ears visible.

During summer, northern long-eared bats roost singly or in colonies often in cavities, or in crevices, of both live and dead trees. This bat seems opportunistic in selecting roosts, using tree species based on suitability to provide cavities or crevices. It has also been found, rarely, roosting in structures like barns and sheds. In late spring pregnant females fly to summer areas where they roost in small colonies and give birth to a single pup. Maternity colonies, with young, generally have 30 to 60 bats, although larger maternity colonies have been observed (USDI 2015b, USDI 2016). Most females within a maternity colony give birth around the same time, which may occur from late May or early June to late July, depending where the colony is located within the species' range. Young bats start flying by 18 to 21 days after birth. Adult northern long-eared bats can live up to 19 years. Northern long-eared bats emerge at dusk to fly through the understory of forested hillsides and ridges feeding on moths, flies, leafhoppers, caddisflies, and beetles, which they catch while in flight using echolocation. This bat also feeds by gleaning motionless insects from vegetation and water surfaces (USDI 2015b, USDI 2016).

The USFWS completed a Biological Opinion (BO) on August 5, 2015 for the continued implementation of Forest Plans in the Southern Region, including the George Washington & Jefferson NFs, related to effects on the northern long-eared bat. The BO relied on continued implementation of existing Forest Plans and excepted activities as described in the April 2nd listing and associated interim 4(d) rule. On January 14, 2016 the FWS published the NLEB final 4(d) rule and it went into effect February 16, 2016. On February 11, 2016 the Southern Region of the Forest Service informed the FWS that the Forest Service will be implementing the NLEB final 4(d) rule using the voluntary process outlined in the January 5, 2016 Biological Opinion associated with the final 4(d) rule in lieu of the August 2015 BO specific to Forest Service activities.

Direct, Indirect, and Cumulative Effects

There would be minimal if any direct effects to this species. Trees over 8 inches would be girdled leaving those trees that are suitable roosts trees standing and usable. Noisy activities such as chainsaw girdling would not be conducted in the summer months reducing potential noise disturbance to this species during the majority of breeding season. Indirect effects are expected to be beneficial because girdling hardwood

trees would turn these trees into snags creating additional potential roost trees for this species. The proposed action is consistent with the 4D rule.

There would be no cumulative effects as a result of implementing the proposed action. Other activities in the action area such as trail maintenance, grazing, and open area prescribed fire are would not impact montane spruce habitat or spruce/ northern hardwood habitat.

Determination of Effects

Implementing this propose action **may affect** but is **not likely to adversely affect** this species because implementation would create more roost trees for this species and incorporating minimization measures into the project reduces impacts to this species.

Spruce-fir Moss Spider

Introduction

The spruce-fir moss spider a small spider with adults measuring only 0.10 to 0.15 inch in size. Colors of the spruce-fir moss spider ranges from light brown to yellow-brown to a darker reddish brown, and there are no markings on its abdomen (USFWS 2019).

The spruce-fir moss spider only lives on the highest mountain peaks in the Southern Appalachian Mountains of western North Carolina, eastern Tennessee, and southwest Virginia primarily in spruce-fir forests over 5,400 feet in elevation. The typical habitat of this spider is damp, but well-drained moss mats growing on rocks and boulders in well-shaded areas within these forests. The moss mats cannot be too dry. This species is very sensitive to desiccation and as the mats dry out so does the spider (USFWS 2019).

The surviving populations of the spruce-fir moss spider are restricted to small areas of suitable moss mats on a few scattered rock outcrops and boulders beneath fir and spruce trees in fir and spruce-fir forests. Destruction of the moss mats or damage to the surrounding vegetation shading the mats could result in the loss of entire populations or even extinction of this species (USFWS 2019).

During the past century, most of the Southern Appalachian spruce-fir forest has suffered extensive changes and declines in size and/or vigor because of past logging and burning practices, storm damage, air pollution, climate change, disease, insect damage, and exposure shock (USFWS 2020).

Direct, Indirect, and Cumulative Effects

There would be no direct effects to this species. Known populations would be buffered to ensure that individuals and their habitat are not disturbed. In areas where potential habitat is available treatments would be designed to avoid drying out moss mats preserving this habitat for spruce-fir moss spider. Indirect effects are not likely to adversely affect this species in the short term and would be beneficial in the long term. Girdling hardwoods, and planting spruce seedlings would allow spruce habitats to increase creating more moist, shaded habitat conditions favored by this species.

There would be no cumulative effects as a result of implementing the proposed action. Other activities in the action area such as trail maintenance, grazing, and open area prescribed fire are would not impact montane spruce habitat or spruce/ northern hardwood habitat.

Determination of Effects

Implementing this propose action **may affect** but is **not likely to adversely affect** this species because habitat would be improved as a result of implementing this project and incorporating minimization measures into the project reduces impacts to this species.

Roan Mountain Bluet

Introduction

This species in endemic to only a few of the highest peaks North Carolina, Tennessee, and Virginia, and can only be found on open, rocky exposures over 4,500 feet in elevation where underlying bedrock is mafic. The largest threats to this species include development at privately owned sites and trampling on public lands (Natureserve 2020).

Direct, Indirect, and Cumulative Effects

There would be no direct or indirect effects to this species. Roan mountain bluet is unlikely to be in much of the potential restoration sites due to its habitat needs of open, sunny conditions. Even so, plant surveys would be conducted in all restoration sites prior to implementation of project activities, and if found the species would be buffered from project activities to ensure protection. There would be no cumulative effects to this species because this project would focus on restoring spruce and no project activities would take place in natural high elevation bald habitat so habitat for this species would not be affected.

Determination of Effects

Implementing this proposed action would have **no effect** this species because restoration sites would be outside potential habitat locations and sites would be survey prior to project implementation to ensure protection.

Rock Gnome Lichen

Introduction

The historical range for this species includes North Carolina and Tennessee. Presently, it has also been found in Georgia, South Carolina, North Carolina, Tennessee, and Virginia. Most observations have trended northeast through western North Carolina, extending over into bordering states (Environmental Conservation Online System, 2020)[3]. Areas of high humidity make up the habitat of this species. Examples include high-elevation vertical rocks that are bathed in fog, and deep gorges at low elevations (U.S. Forest Service, 2020)[4]. This species of rock gnome lichen was listed as endangered in 1995 (Environmental Conservation Online System, 2020)[3]. Threats to this species include logging, collection, and habitat disturbance due to hiking and climbing. Rock gnome lichen is dependent on Fraser fir and spruce trees at high elevations for protection against high-intensity solar radiation. Exotic insect pests and air pollution indirectly threaten rock gnome lichen by killing Fraser fir trees in the southern Appalachians. (U.S. Forest Service, 2020)[4].

Direct, Indirect, and Cumulative Effects

There would be no direct effects to this species. Known locations would be buffered to prevent potential impacts to this species. Also plant surveys would be conducted prior to implementation so any unknown locations that may be impacted by the project would be buffered to protect individuals. Indirect effects are

not likely to adversely affect this species in the short term and would be beneficial in the long term. Girdling hardwoods, and planting spruce would increase the spruce composition in the canopy in turn creating more moist conditions favored by the rock gnome lichen. Implementing this project could increase potential habitat for this species.

There would be no cumulative effects as a result of implementing the proposed action. Other activities in the action area such as trail maintenance, grazing, and open area prescribed fire are would not impact montane spruce habitat or spruce/ northern hardwood habitat.

Determination of Effects

Implementing this proposed action **may affect** but is **not likely to adversely affect** this species because implementation would create more habitat for this species in the long term and incorporating minimization measures into the project reduces impacts to this species.

4. Summary of determinations and signature of preparers

Based on the information and analysis above, the following determinations of effects were made for the activities proposed in this project.

Table 2. Summary of determinations

Species	Scientific Name	Status	Species Type	Considered but Excluded from further Analysis	Considered Further in the BA	Determination
Carolina Northern Flying Squirrel	*Glaucomys sabrinus coloratus*	Endangered	Mammal		✓	May affect, not likely to adversely effect
Gray Bat	*Myotis grisescens*	Endangered	Mammal	✓[2]		No effect
Indiana Bat	*Myotis sodalis*	Endangered	Mammal		✓	May affect, not likely to adversely effect
Northern Long-eared Bat	*Myotis septentrionalis*	Threatened	Mammal		✓	May affect, not likely to adversely effect
Virginia Big-eared Bat	*Corynorhinus townsendii virginianus*	Endangered	Mammal	✓[1]		No effect
Spotfin Chub	*Erimox monachus*	Threatened	Fish	✓[1]		No effect
Fluted Kidneyshell	*Ptychobranchus subtentum*	Endangered	Clam	✓[1]		No effect
Littlewing Pearlymussel	*Pegias fabula*	Endangered	Clam	✓[1]		No effect
Shiny Pigtoe	*Fusconaia cor*	Endangered	Clam	✓[1]		No effect
Slabside Pearlymussel	*Pleuronaia dolabelloides*	Endangered	Clam	✓[1]		No effect
Tan Riffleshell	*Epioblasma Florentina walkeri*	Endangered	Clam	✓[1]		No effect
Spruce-fir Moss Spider	*Microhexura montivaga*	Endangered	Arachnid		✓	May affect, not likely to adversely effect
Roan Mountain Bluet	*Hedyotis purpurea var. montana*	Endangered	Flowering Plant		✓	No effect
Rock Gnome Lichen	*Gymnoderma lineare*	Endangered	Lichen		✓	May affect, not likely to adversely effect

Notes:
[1] Project areas are not within the species' known range or watershed on the Mount Rogers National Recreation Area.
[2] Project areas are not currently appropriate or potentially appropriate habitat for the species.

These determinations were made by qualified staff of the George Washington/Jefferson National Forests based on the best available science and other relevant information. If new information or changed circumstances affect these determinations, forest staff will reinitiate consultation pursuant to Forest Service policies and requirements under Sect. 7 of the Endangered Species Act.

/s/ Brittany B. Phillips Date: 07/13/2020

Brittany B. Phillips

Wildlife Biologist, Mount Rogers National Recreation Area

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Appendix A

OAR Step Down Process

A “step down” process was followed to eliminate species from further analysis and focus on those species that may be affected by proposed project activities. Species not eliminated are then analyzed in greater detail. Results of this step-down analysis process are displayed in the Occurrence Analysis Results (OAR) column of the table in Appendix A. First, the range of a species was considered. Species’ ranges on the Forest are based on county records contained in such documents as the “Atlas of the Virginia Flora,” but are further refined when additional information is available, such as more recent occurrences documented in scientific literature or in Natural Heritage databases. Many times, range information clearly indicates a species will not occur in the project area due to the restricted geographic distribution of most TES species. When the project area is outside a known species range, that species is eliminated from further consideration by being coded as OAR code "1" in the Appendix A table.

From past field surveys and knowledge of the area, and given the proposed action, those species which are analyzed and discussed further in this document are those that: a) are found to be located in the activity areas (OAR code “5”); b) were not seen during the survey(s), but possibly occur in the activity areas based on habitat observed during the survey(s) or field survey was not conducted when species is recognizable (OAR code “6”); c) for aquatic species, they are known or suspected downstream of project or activity areas and within identified geographic bounds of water resource cumulative effects analysis area (OAR code “8”) and d) federally listed mussel and/or fish species known in 6th level watershed of project areas. Conservation measures from USFWS/FS Conservation Plan applied (OAR code “9”).

A total of 14 species were identified by USFWS in IPAC at having potential to be in the project area. However since the IPAC species is generated using county lines and/or buffers some these species either do not have habitat in the project area or are located in a different watershed. These species will not be impacted by this project and will receive a no effect determination. More information on those species can be found in the determination table and species affected tables in the main body of this document. The following species are known or suspected to occur in or near the area or are potentially impacted by the proposed action and are coded OAR Code 6 or 9:

Documentation of Threatened and Endangered Species Occurrences for (Whitetop Spruce Restoration)
Coding for Occurrence Analysis Results (OAR) for 199 species

Forest updated April 30, 2020 (based on Region 8 sensitive species list effective March 15, 2018)

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
VERTEBRATE										
Fish										
1	-	X	*Chrosomus cumberlandensis*	Blackside dace	Upper Cumberland R, Upper Powell R, Poor Fk Cumberland R, Clinch R drainage - Staunton Ck McGhee Ck	Aquatic-streams.	T	G2	S1	S3 (KY)
1	-	X	*Erimonax monachus*	Spotfin chub	Lower N Fk Holston R	Aquatic-streams.	T	G2	S1	-
1	-	X	*Erimystax cahni*	Slender chub	Two sites - Powell R, Lee Co	Aquatic-rivers.	T	G1	S1	-
1	-	X	*Etheostoma osburni*	Candy darter	Big Stony Ck, Dismal Creek, Cripple Creek (New R watershed)	Aquatic-streams.	E	G3	S1	S2
1	-	X	*Etheostoma percnurum*	Duskytail darter	Copper Ck, Clinch R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Noturus flavipinnis*	Yellowfin madtom	Lower & Mid reaches of Copper Ck, Powell R	Aquatic-streams.	T	G1	S1	-
1	-	X	Percina rex	Roanoke logperch	Upper Roanoke R watershed	Aquatic-rivers.	E	G1G2	S1S2	-
Mammal										
1	X	X	*Corynorhinus townsendii virginianus*	Virginia big-eared bat	Summer: VA - Tazewell Co (3 caves), Highland Co (1 cave); WV - Pendleton Co (4 caves); Winter: Highland, Rockingham, Bland, and Tazewell Cos (6 caves); Pendleton Co (6 caves). Largest VA population in Tazewell Co and largest WV population in Pendleton Co. Small numbers of bats (usually <10) in a few other widely scattered caves during summer months. Bath & Pulaski Co records are historic. No occupied caves currently known on Forest.	Resides in caves winter and summer. Short distance migrant (<40 miles) between winter and summer caves. Forages primarily on moths and foraging habitat is common (fields, forests, meadows, etc.). Forages within 6 miles of summer caves. USFWS Critical Habitat is 5 caves in WV (4 Pendleton Co and 1 Tucker Co). Closest Critical Habitat cave to GWJNF is ~3 miles in Pendleton Co, WV. OAR code of "2" used when project further than 6 miles from summer or winter occupied cave.	E	G3G4T2	S1	S2
6	-	X	*Glaucomys sabrinus coloratus*	Carolina northern flying squirrel	Mt Rogers & Whitetop area	Spruce-fir forests and adjacent northern hardwoods.	E	G5T2	S1	-
2	-	X	*Myotis grisescens*	Gray bat	Ridge & Valley, Clinch R watershed; Russell Fk at Russell Fk/Pound R confluence.	Caves winter and summer, forages widely.	E	G3	S1	-
6	X	X	*Myotis septentrionalis*	Northern long-eared bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Hibernates in crevices and cracks of cave walls during winter (sometimes mines & tunnels), difficult to find and rarely seen. During summer, forages widely and roosts singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. Also may roost in structures like barns, sheds, & houses. Decline due to WNS.	T	G1G2	S3	S3
6	X	X	*Myotis sodalis*	Indiana bat	Blue Ridge, Ridge & Valley, Cumberland Mtns	Caves winter, upland hardwoods summer, forages widely along riparian areas and open woodlands.	E	G2	S1	S1
INVERTEBRATE										
Mussel (Mollusk, Class Bivalvia)										
1	-	X	*Cumberlandia monodonta*	Spectaclecase	2 sites Clinch R	Aquatic-rivers.	E	G3	S1	-
1	-	X	*Cyprogenia stegaria*	Fanshell	Lower Clinch R, Scott Co	Aquatic-rivers.	E	G1Q	S1	S1
1	-	X	*Dromus dromas*	Dromedary pearlymussel	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
1	X	X	*Elliptio lanceolata*	Yellow lance	Roanoke R, James R	Aquatic-rivers.	T	G2G3	S2S3	-
1	-	X	*Epioblasma brevidens*	Cumberlandian combshell	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Epioblasma capsaeformis*	Oyster mussel	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Epioblasma florentina aureola*	Golden riffleshell	Restricted to lower 1.0 mile of Indian Ck to Clinch R. All other historical populations in M & Upper Tennessee R system now extirpated.	Aquatic-rivers. Formerly: tan riffleshell.	E	G1T1	S1	-
1	-	X	*Epioblasma torulosa gubernaculum*	Green-blossom pearlymussel	Clinch R, N Fk Holston R	Aquatic-rivers.	E	G2TX	SX	-
1	-	X	*Epioblasma triquetra*	Snuffbox	Clinch R, Powell R, N Fk Holston R	Aquatic-rivers.	E	G3	S1	S2
1	-	X	*Fusconaia cor*	Shiny pigtoe	Clinch R, Powell R, N Fk Holston R, Copper Ck	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Fusconaia cuneolus*	Fine-rayed pigtoe	Clinch R, Powell R, Copper Ck, Little R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Hemistena lata*	Cracking pearlymussel	Clinch R, Powell R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Lampsilis abrupta*	Pink mucket	Clinch R	Aquatic-rivers.	E	G2	SX	S1
1	-	X	*Lemiox rimosus*	Birdwing pearlymussel	Clinch R, Powell R, Copper Ck, Little R	Aquatic-rivers.	E	G1	S1	-
1	X	X	*Parvaspina collina*	James spinymussel	Potts Ck, Craig Ck, Johns Ck, Patterson Run, Pedlar R, Cowpasture R, Mill Ck (Deerfield)	Aquatic-rivers. Formerly: *Pleurobema collina*.	E	G1	S1	S1
7	-	X	*Pegias fabula*	Little-winged pearlymussel	Clinch R, N Fk Holston R, S Fk Holston R, Little R	Aquatic-streams.	E	G1	S1	-
1	-	X	*Plethobasus cyphyus*	Sheepnose	Clinch R, Powell R	Aquatic-rivers.	E	G3	S1	S1
1	-	X	*Pleurobema plenum*	Rough pigtoe	Clinch R	Aquatic-rivers.	E	G1	SH	SH
7	-	X	*Pleuronaia dolabelloides*	Slabside pearlymussel	Clinch R, M Fk Holston, N Fk Holston R	Aquatic-rivers.	E	G2	S2	-

OAR	GW	J	Species Name	Common Name	Range on or near GWJNFs	Habitat - Detail	TES	GRank	VA SRank	WV SRank
7	-	X	*Ptychobranchus subtentum*	Fluted kidneyshell	Holston R., Powell R., Indian R., Clinch R., Little R., Copper Ck., Big Moccasin Ck. Critical Habitat: Indian Ck, VA: M Fk Holston R. VA: Big Moccasin Ck., VA: Copper Ck., VA; Clinch R, TN, VA: Powell R., TN, VA	Aquatic-rivers.	E	G2	S2	-
1	-	X	*Quadrula cylindrica strigillata*	Rough rabbits foot	Clinch R, Powell R, N Fk Holston R, Copper Ck	Aquatic-streams.	E	G3G4T2	S2	-
1	-	X	*Quadrula intermedia*	Cumberland monkeyface	Powell R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Quadrula sparsa*	Appalachian monkeyface	Clinch R, Powell R	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Villosa perpurpurea*	Purple bean	Clinch R, Copper Ck	Aquatic-rivers.	E	G1	S1	-
1	-	X	*Villosa trabalis*	Cumberland bean	Clinch R	Aquatic-rivers.	E	G1	SX	-
Spider (Arachnid)										
6	-	X	*Microhexura montivaga*	Spruce-fir moss spider	Whitetop Mtn	Damp, well-drained moss and liverwort mats on boulders in mature spruce-fir forests.	E	G1	S1	-
Isopod (Crustacean, Order Isopoda)										
1	X	-	*Antrolana lira*	Madison Cave Isopod	Documented population centers in Waynesboro-Grottoes area, Augusta Co; Harrisonburg area Rockingham Co; valley of main stem of Shenandoah R, Warren, Cos,VA: Jefferson Co, WV. Not known from GWNF.	Aquatic-subterranean obligate in caves and karst groundwater.	T	G2G4	S2	S1
Crayfish (Crustacean, Order Decapoda)										
1	-	X	*Cambarus callainus*	Big Sandy crayfish	In VA, Upper Russell Fk drainage Big Sandy R	Aquatic-streams. Fast flowing streams of moderate width. Formerly: *Cambarus veteranus*.	T	G2	S1S2	S1
Bee (Insect, Order Hymenoptera)										
10	X	X	*Bombus affinis*	Rusty-patched bumble bee	Bath Co, VA: new location on Warm Springs RD, Duncan Knob found 6/2017. Following VA/WV county occurrences historic (Alleghany, Carroll, Frederick, Giles, Grayson, Montgomery, Nelson, Page, Pulaski, Rockbridge, Rockingham, Wythe Cos., VA; Hardy, Hampshire, Monroe, Pendleton, Pocahontas Cos, WV).	Habitat generalist: grasslands, old field, mature woods, open woodlands, mixed farmland edges, marshes, urban areas. Feeds from a variety of plants for pollen and nectar, including flowering rhododendron and mountain laurel. Nest sites include abandoned rodent burrows, fallen dead wood, stumps. Queen only overwinters.	E	G1	SH	-
NON-VASCULAR PLANT										
Lichen										
6	-	X	*Gymnoderma lineare*	Rock gnome lichen	Whitetop Mtn	Spruce-fir forests.	E	G2	S1	-
VASCULAR PLANT										
1	-	X	*Betula uber*	Virginia round-leaf birch	One location: Cressy Ck, Smyth Co.	Riparian, mixed open forest, usually disturbed sites.	T	G1Q	S1	-
1	X	-	*Boechera serotina*	Shale barren rockcress	Ridge & Valley N of James R watershed	Shale barrens and adjacent open oak woods.	E	G2	S2	S2
1	X	X	*Echinacea laevigata*	Smooth coneflower	Alleghany, Montgomery Cos	Open woodlands and glades over limestone or dolomite.	E	G2G3	S2	-
1	X	-	*Helenium virginicum*	Virginia sneezeweed	Endemic to Augusta, Rockingham Cos.	Seasonally dry meadows and sinkhole depressions.	T	G3	S2	-
1	X	-	*Helonias bullata*	Swamp-pink	Augusta, Nelson Cos	Sphagnum bogs, seeps, and streamsides.	T	G3	S2S3	-
1	-	X	*Iliamna corei*	Peter's Mountain-mallow	One location: Narrows, Peters Mountain, Giles Co.	Rich, open woods along sandstone outcrops, soil pockets, fire maintained.	E	G1	S1	-
1	X	X	*Isotria medeoloides*	Small whorled pogonia	In mountains of VA known only from Bedford, Craig, and Lee Cos; other VA occurrences in Piedmont & Coastal Plain.	Open, mixed hardwood forests on level to gently sloping terrain with north to east aspect.	T	G2?	S2	S1
2	X	X	*Scirpus ancistrochaetus*	Northeastern bulrush	Ridge & Valley	Mountain ponds, sinkhole ponds in Shenandoah Valley.	E	G3	S2	S1
2	-	X	*Spiraea virginiana*	Virginia spiraea	Blue Ridge, Ridge & Valley, S of New R	Scoured banks of streams, riverside or island shrub thickets.	T	G2	S1	S1

LEGEND FOR TES SPECIES LIST IN OCCURRENCE ANALYSIS RESULTS:

OAR CODES:

1 = Project located out of known species range.
2 = Lack of suitable habitat for species in project area.
3 = Habitat present, species was searched for during field survey, but not found.
4 = Species occurs in project area, but outside of activity area.
5 = Field survey located species in activity area.
6 = Species not seen during field survey, but possibly occurs in activity area based on habitat observed; or field survey not conducted when species is recognizable (time of year or time of day). Therefore assume presence and no additional surveys needed.
7 = Aquatic species or habitat known or suspected downstream of project/activity area, but outside identified geographic bounds of water resource cumulative effects analysis area (defined as point below which sediment amounts are immeasurable and insignificant).

8 = Aquatic species or habitat known or suspected downstream of project/activity area, but inside identified geographic bounds of water resource cumulative effects analysis area.
9 = Project occurs in a 6th level watershed included in the USFWS/FS T&E Mussel and Fish Conservation Plan (August 8, 2007 U.S. Fish & Wildlife Service concurrence on updated watersheds). Conservation measures from the USFWS/FS T&E Mussel and Fish Conservation Plan applied.
10 = Historic records for this species only; or no known records on GWJ; or species considered extirpated from Virginia/West Virginia.

SPECIES: The term "species" includes any subspecies of fish, wildlife or plants, and any distinct population segment of any species or vertebrate fish or wildlife, which interbreeds when mature (Endangered Species Act of 1973, as amended through the 100th Congress).

RANGE: The geographical distribution of a species. For use here "range" is expressed as where a species is known or expected to occur on or near the George Washington and Jefferson National Forests in terms of landform (feature name, physiographic province), political boundary (county name), or watershed (river, or stream name).

HABITAT: A place where the physical and biological elements of ecosystems provide a suitable environment and the food, cover and space resources needed for plant and animal livelihood (FSM 2605-91-8, pg. 10 of 13).

TES CODES:

T = Federally listed as Threatened
E = Federally listed as Endangered
P = Federally Proposed as T or E
S = Southern Region (R8) Sensitive species

GLOBAL RANK: Global ranks are assigned by a consensus of the network of natural heritage programs, scientific experts, NatureServe and The Nature Conservancy to designate a rarity rank based on the range-wide status of a species or variety. This system was developed by The Nature Conservancy and is widely used by other agencies and organizations as the best available scientific and objective assessment of taxon rarity and level of threat to its existence. The ranks are assigned after considering a suite of factors including number of occurrences, numbers of individuals, and severity of threats.

G1 = Extremely rare and critically imperiled with 5 or fewer occurrences or very few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.
G2 = Very rare and imperiled with 6 to 20 occurrences or few remaining individuals; or because of some factor(s) making it especially vulnerable to extinction.
G3 = Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range; or vulnerable to extinction because of other factors. Usually fewer than 100 occurrences are documented.
G4 = Common and apparently secure globally, although it may be rare in parts of its range, especially at the periphery.
G5 = Very common and demonstrably secure globally, although it may be rare in parts of its range, especially at the periphery.
GH = Formally part of the world's biota with the exception that may be rediscovered.
GX = Believed extinct throughout its range with virtually no likelihood of rediscovery.
GU = Possibly rare, but status uncertain and more data needed.
G? = Unranked, or, if following a ranking, ranking uncertain (ex. G3?).
G_Q = Taxon has a questionable taxonomic assignment, such as G3Q.
G_T = Signifies the rank of a subspecies or variety. For example, a G5T1 would apply to a subspecies of a species that is demonstrably secure globally (G5) but the subspecies warrants a rank of T1, critically imperiled.

STATE RANK: The following ranks are used by the Virginia Department of Conservation and Recreation to set protection priorities for natural heritage resources. Natural Heritage Resources (NHRs) are rare plant and animal species, rare and exemplary natural communities, and significant geologic features. The criterion for ranking NHRs is the number of populations or occurrences, i.e. the number of known distinct localities; the number of individuals in existence at each locality or, if a highly mobile organism (e.g., sea turtles, many birds, and butterflies), the total number of individuals; the quality of the occurrences, the number of protected occurrences; and threats.

- **S1** - Extremely rare; usually 5 or fewer populations or occurrences in the state; or may be a few remaining individuals; often especially vulnerable to extirpation.
- **S2** - Very rare; usually between 6 and 20 populations or occurrences; or with many individuals in fewer occurrences; often susceptible to becoming extirpated.
- **S3** - Rare to uncommon; usually between 21 and 100 populations or occurrences; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.
- **S4** - Common; usually >100 populations or occurrences, but may be fewer with many large populations; may be restricted to only a portion of the state; usually not susceptible to immediate threats.
- **S5** - Very common; demonstrably secure under present conditions.
- **SA** - Accidental in the state.
- **S#B** - Breeding status of an organism within the state.
- **SH** - Historically known from the state, but not verified for an extended period, usually > 15 years; this rank is used primarily when inventory has been attempted recently.
- **S#N** - Non-breeding status within the state. Usually applied to winter resident species.
- **SR** – Reported for Virginia, but without persuasive documentation that would provide a basis for either accepting or rejecting the report.
- **SU** - Status uncertain, often because of low search effort or cryptic nature of the element.
- **SX** - Apparently extirpated from the state.
- **SZ** - Long distance migrant, whose occurrences during migration are too irregular, transitory and/or dispersed to be reliably identified, mapped and protected.
- **NA** – Not Applicable- A conservation status rank in not applicable because the species is not a suitable target for conservation activities.

These ranks should not be interpreted as legal designations.